

REMARKS

Claims 1-14 are currently pending. In the Office Action, the Examiner has objected to the drawings for not depicting each and every feature of the invention as specified in the claims. Further, the Examiner has rejected Claims 11, 12, and 13 as reciting something not detailed in the Specification. Applicants submit herewith a new Fig. 9 which depicts the structure claimed in Claims 11-13 wherein more than one successive layer is provided to the structure. The Specification has been amended to include the description of Fig. 9. No new matter is added by these amendments, since the structure was detailed in the originally-submitted claims.

Claims 1, 2, 4, 8-9 have been rejected as anticipated by Geffken; Claims 3, 7 as unpatentable over Geffken in view of Lee; and, Claims 5, 6, 12, 14 as unpatentable over Geffken. For the reasons set forth below, Applicants respectfully assert that the pending claims are patentable over the cited art.

The Geffken patent teaches a structure in which decoupling capacitors are provided with increased surface area (and therefore increased capacitance) by including both the top surface of embedded metal plugs 12 as well as the side and top surfaces of metal studs 14 as the first capacitor plate. The Examiner has referenced "...two or more adjacent aluminum

conductors 14' disposed in at least one dielectric layer 28 formed over the substrate 10 and electrically isolated from each other, wherein each pair of adjacent aluminum conductors is separated by a gap, and first high dielectric constant material 16' formed in the gap between two adjacent conductors 14'....". Applicants respectfully note that the Geffken conductors 14' are NOT electrically isolated from each other. As is clear from both a review of the figures, adjacent conductors 14' are electrically connected via the overlap with the surface of underlying conductors 12'. As is expressly recited at Col. 2, lines 38-39, and at Claim 1, lines 16-17, the interconnect lines 14 are formed to be "[P]artially overlapping and in electrical connection with the filled vias [(i.e., vias 13 filled with conductive material 12)]". Clearly the Geffken patent is not teaching that adjacent conductors are electrically isolated from each other as is expressly required by the present claims. Clearly no capacitance is being realized between electrically connected studs 14'. The capacitors of Geffken are comprised of first metal "plate" 12', 14', intermediate dielectric layer 16', and second metal "plate" 18'. Applicants further note that the Geffken capacitor structure does not anticipate the claimed invention since the Geffken capacitor structure, comprising first plate 14', intermediate dielectric 16' and second plate 18' is not the same as, nor suggestive of, the claimed structure comprising two or more adjacent conductors...electrically isolated from each

other...separated by a gap with a first high dielectric material filling the gap between adjacent conductors.

To further highlight the differences between the Geffken structure and the present invention, the language of independent Claim 1 has been amended to emphasize that the two adjacent conductors are electrically isolated from each other, as is clearly taught and illustrated by the present application, and that the high dielectric material fills the gap between adjacent conductors, which is clearly not taught or suggested by the Geffken patent.

To anticipate claim language under 35 USC 102, a reference must teach each and every claim feature. Since the Geffken patent does not teach adjacent conductors which are electrically isolated from each other and separated by a gap which is filled with high dielectric constant material, it cannot be maintained that Geffken anticipates the invention as claimed. Further, a reference which does not anticipate the language of an independent claim cannot be said to anticipate the language of claims which depend therefrom and add limitations thereto. Accordingly, it cannot be maintained that Geffken anticipates Claims 2, 4, and 8-9.

Claims 5, 6, 12 and 14 are rejected as unpatentable over the Geffken patent since the Examiner has concluded that "it would have been obvious to one of ordinary skill in the art to form a diffusion barrier between the high dielectric constant layer and

the conductors in order to prevent impurity diffuses [sic] to the dielectric layer." Applicants respectfully assert that some suggestion must be found in the art in order to support the obviousness rejection. Clearly Geffken does not teach or suggest the use of the diffusion barrier layer. Moreover, Geffken expressly teaches at Col. 2, line 58-60 that the "thinner the dielectric insulator layer, the higher the capacitance", which appears to teach away both from a filled gap and any intermediate layers such as a diffusion barrier. Accordingly, Applicants conclude that the Geffken patent does not suggest, and would not reasonably be modified to arrive at, the invention as claimed.

The Examiner has also rejected Claims 3 and 7 as unpatentable over the combination of teachings of the Geffken and Lee patents. As discussed above, the Geffken patent has not been properly interpreted in rejecting Claims 1-2, 4-6, 8-9, 12, and 14. Furthermore, Applicants respectfully contend that the Lee patent does not provide those teachings which are missing from the Geffken patent for rejecting the independent claim, Claim 1, or any of the remaining claims which depend therefrom. While the Lee patent discloses the use of a high dielectric constant material in a capacitor, such does not obviate the claimed structure wherein a high dielectric material is disposed to fill a gap formed between adjacent conductors which are electrically isolated from each other and/or between successive layers of conductors which are electrically isolated from each other, let

alone such structures further comprised of specific materials and/or dimensions.

Applicants assert that even if one were to combine the teachings of the Geffken and Lee patents, one would not arrive at the invention as claimed. If one having skill in the art were to modify Geffken using the Lee teachings, one would arrive at the Geffken structure, having electrically connected metal studs as a first capacitor plate (e.g., 12' and 14' of Figure 2), the Lee high dielectric material as the intermediate capacitor dielectric (layer 16'), and conductive material 18' as the second capacitor plate. Such a combination would not obviate the invention as claimed. Accordingly, Applicants believe that the pending claims are patentable over the cited combination of references and respectfully request withdrawal of the rejections under 35 U.S.C. 103.

Based on the foregoing amendments and remarks, Applicants respectfully request entry of the amendments, withdrawal of the objections, withdrawal of the rejections, and issuance of the claims.

Respectfully submitted,

H.H. Chen, et al

By: Anne Vachon Dougherty
Anne Vachon Dougherty
Registration No. 30,374
Tel. (914) 962-5910